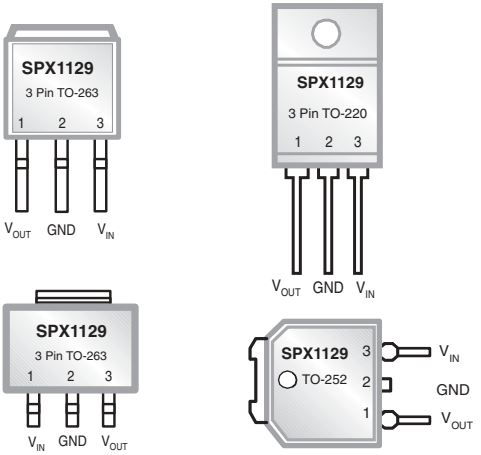
SPX1129

400mA Low Dropout Voltage Regulator

FEATURES

- 1% Output Accuracy 3.3V, 5V, at 500mA Output
- Very Low Quiescent Current
- 0.42V Dropout Voltage at 400mA
- Extremely Tight Load and Line Regulation
- Current & Thermal Limiting
- Reverse Battery Protection
- Equivalent Replacement For LT1129



APPPLICATIONS

- Power Supply
- Communications Equipment
- Computers and Peripherals

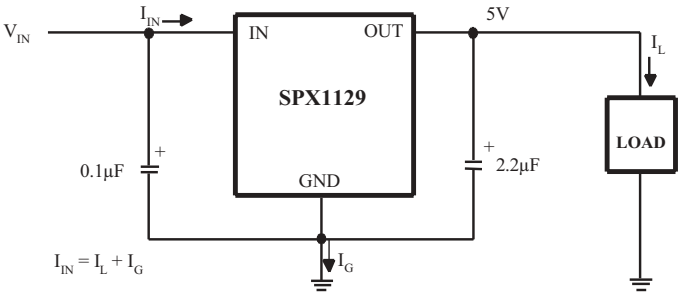
Now Available in Lead Free Packaging

DESCRIPTION

The SPX1129 is a low power voltage regulator. This device is an excellent choice for use in battery-powered applications such as cordless telephones, radio control systems, and portable computers. The SPX1129 features very low quiescent current and very low dropout voltage of 0.42 volts. This includes a tight initial tolerance of ±1% max, and a very low output temperature coefficient, making the SPX1129 useful as a low-power voltage reference.

The SPX1129 is offered in a SOT-223, TO-220, TO-252 & TO-263 3 lead packages.

TYPICAL APPLICATION CIRCUIT



Fixed +5V Regulator Circuit..

ABSOLUTE MAXIMUM RATINGS

Power Dissipation ..... Internally Limited
Lead Temp. (Soldering, 5 Seconds) ..... 260°C
Storage Temperature Range ..... -65°C to +150°C
Operating Junction Temperature Range ..... -40°C to +125°C

Input Supply Voltage ..... -20V to +20V
ESD Rating ..... 2kV Min

ELECTRICAL CHARACTERISTICS

Electrical characteristics at V_{IN} = 6V, I_O = 1mA, C_{OUT} = 2.2µF, T_A = 25°C, unless otherwise specified. **Boldface** applies over the full operating temperature range.

PARAMETER	CONDITIONS (Note 2)	TYP	MIN	MAX	UNITS
3.3V Version					
Output Voltage		3.3	3.267	3.333	V
	1mA ≤ I_L ≤ 400mA	**3.3**	**3.217**	**3.382**	
Reverse Output Current	V_{OUT}= 3.3V, V_{IN}= 0V	16		25	µA
5.0V Version					
Output Voltage		5.0	4.950	5.050	V
	1mA ≤ I_L ≤ 400mA	**5.0**	**4.880**	**5.120**	
Reverse Output Current	V_{OUT}= 5.0V, V_{IN}= 0V	16		25	µA
All Voltage Options					
Output Voltage Temperature Coefficient	(Note1)	20		**100**	ppm/°C
Line Regulation	6V ≤ V_{IN} ≤ 20V (Note 4)	1.5		**10**	mV
Load Regulation (Note 3)	I_L=1 to 400mA	6		20 **30**	mV
Dropout Voltage (Note 5)	I_L=1mA	0.13		0.17 **0.25**	V
	I_L=400mA	0.42		0.55 **0.70**	
Ground Current	I_L=1mA	**100**		**200**	µA
	I_L=10mA	**350**		**500**	
	I_L=50mA	**1.5**		**3**	mA
	I_L=100mA	**2**		**6**	
	I_L=400mA	**7**		**25**	
Current Limit	V_{OUT}=0	330		**800**	mA
Ripple Rejection	V_{IN} -V_{OUT}=1V(Avg), V_{RIPPLE}=0.5Vp-p, F_{RIPPLE}=120Hz, I_{LOAD}=400mA, T_J= 25°C	58	50		dB
Input Reverse Leakage Current	V_{IN}= -20V, V_{OUT}=0V			**1.0**	mA

Note 1: Output or reference voltage temperature coefficients defined as the worst case voltage change divided by the total temperature range.
Note 2: Unless otherwise specified all limits are guaranteed for T_j = 25°C, V_{IN} = 6V, I_L = 1mA and C_L = 2.2µF.
Note 3: Regulation is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.
Note 4: Line regulation for the SPX1129 is tested at 25°C for I_L = 1 mA. For T_J = 125°C, line regulation is guaranteed by design.
Note 5: Dropout voltage is defined as the input to output differential at which the output voltage drops 100 mV below its nominal value measured at 1V differential.

External Capacitors

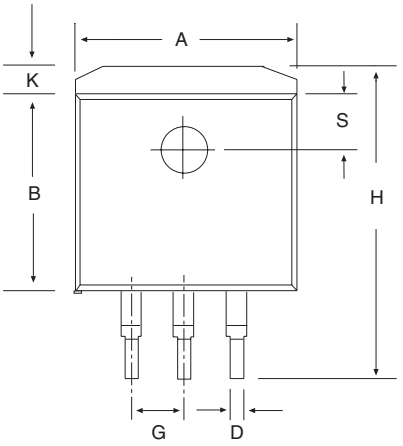
The stability of the SPX1129 requires a 2.2µF or greater capacitor between output and ground. Oscillation could occur without this capacitor. Most types of tantalum or aluminum electrolytic works fine here. For operations of below -25°C solid tantalum is recommended since the many aluminum types have electrolytes that freeze at about -30°C. The ESR of about 5Ω or less and resonant frequency above 500kHz are the most important parameters in the value of the capacitor. The capacitor value can be increased without limit.

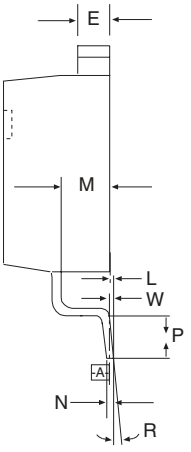
The SPX1129, unlike other low dropout regulators will remain stable and in regulation with no load in addition to the internal voltage divider. This feature is especially important in applications like CMOS RAM keep-alive.

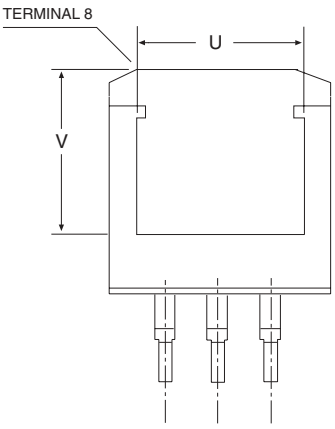
If there is more than 10 inches of wire between the input and the AC filter capacitor, or if a battery is used as the input, then a 0.1µF tantalum or aluminum electrolytic capacitor should be placed from the input to the ground.

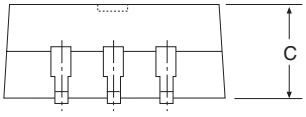
Reducing Output Noise

It may be an advantage to reduce the AC noise present at the output. One way is to reduce the regulator bandwidth by increasing the size of the output capacitor. Increasing the capacitor from 1µF to 220µF decreases the noise from 430µV to 160µV rms for a 100kHz bandwidth at 5V output.



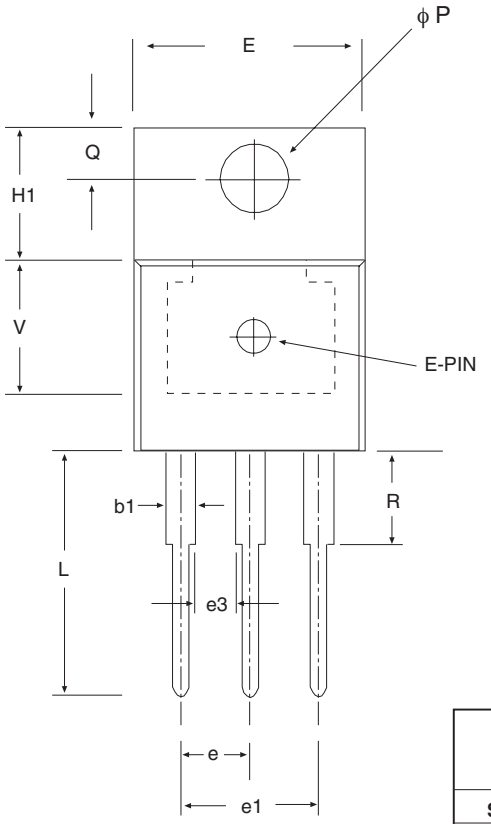


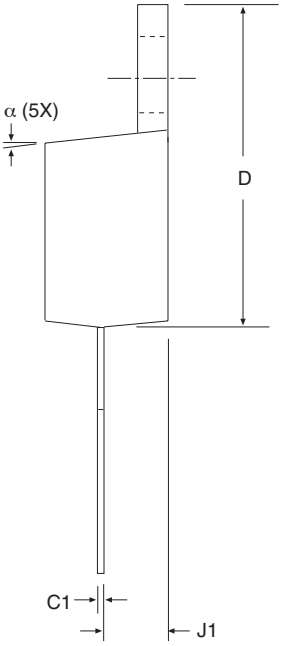


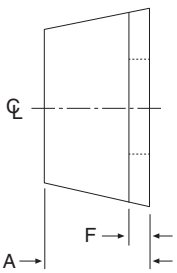


DIMENSIONS in inches		
SYMBOL	**MIN**	**MAX**
A	.396	0.406
B	0.326	0.336
C	0.170	0.180
D	0.026	0.036
E	0.045	0.055
G	0.100 REF	0.100 REF
H	0.580	0.620
K	0.055	0.066
L	.000	.010
M	0.098	0.108
N	.017	.023
P	.090	.110
R	0°	8°
S	.095	.105
U	.30 REF	.30 REF
V	.305 REF	.305 REF
W	.010	.010

3 Pin TO-263

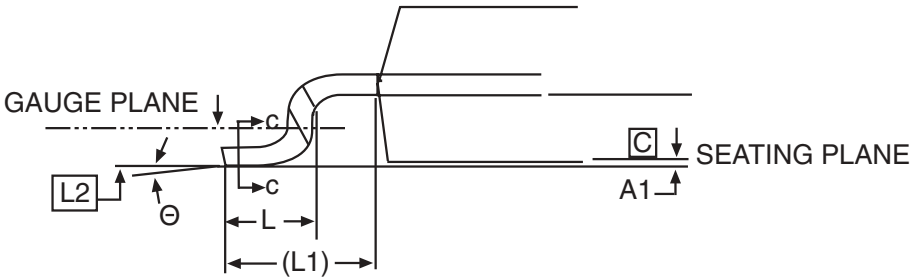


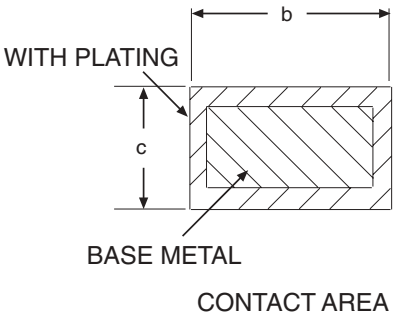


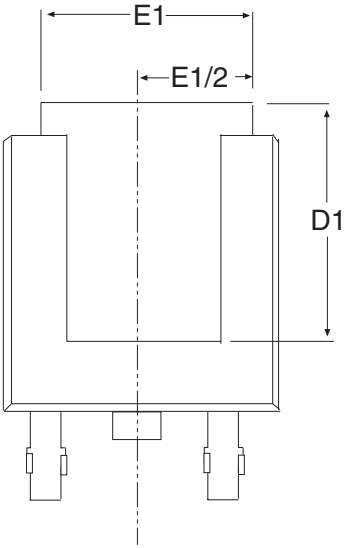


DIMENSIONS in inches		
SYMBOL	**MIN**	**MAX**
A	0.160	0.190
b	0.025	0.040
C1	0.015	0.022
D	0.560	0.590
E	0.385	0.415
e	0.090	0.110
e1	0.190	0.210
e3	0.045	0.055
F	0.045	0.055
H1	0.234	0.258
J1	0.090	0.115
ϕ P	0.146	0.156
Q	0.103	0.113
L	0.540	0.560
α	3° typ	7° typ
b1	0.450	0.060
R	0.243 REF	6.170 REF
U	0.300 REF	7.620 REF
V	0.240 REF	6.100 REF

3 Pin TO-220

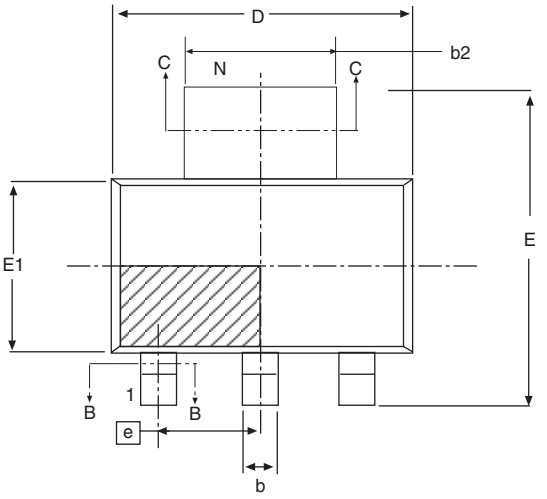


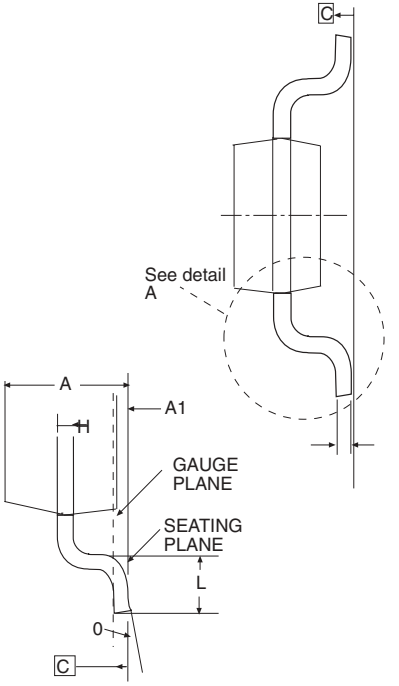




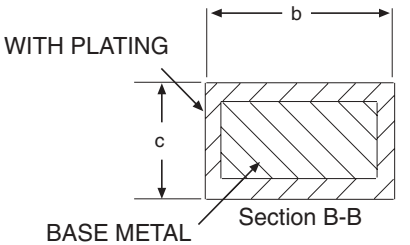
3 PIN TO-252 JEDEC TO-252 (AA) Variation	Dimensions in inches		
	MIN	NOM	MAX
A1	-	-	.005
c	.018	-	.024
D1	.205	-	-
E1	.170	-	-
H	.370	-	.410
L	.055	.060	.070
L1	.108 REF		
L2	.020 BSC		

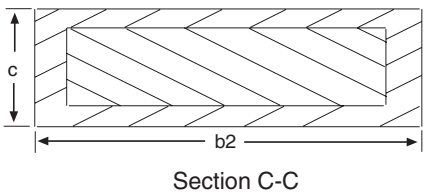
3 PIN TO-252





3 PIN SOT-223 JEDEC TO-261 (AA) Variation	Dimensions in (mm)		
	MIN	NOM	MAX
A	-	-	1.80
A1	0.02	-	0.10
A2	1.50	1.60	1.70
b	0.66	0.76	0.84
b2	2.90	3.00	3.10
c	0.23	0.30	0.35
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.30 BASIC		
e1	4.60 BASIC		
L	0.75	-	-
ø	0º	-	10º





3 PIN SOT-223

PART NUMBER	ACCURACY	TEMPERATURE	OUTPUT VOLTAGE	PACKAGES
SPX1129M3-3.3	1%	-40°C to 125°C	3.3V	3-Pin SOT-223
SPX1129M3-3.3/TR	1%	-40°C to 125°C	3.3V	3-Pin SOT-223
SPX1129M3-5.0	1%	-40°C to 125°C	5.0V	3-Pin SOT-223
SPX1129M3-5.0/TR	1%	-40°C to 125°C	5.0V	3-Pin SOT-223
SPX1129R-3.3	1%	-40°C to 125°C	3.3V	3-Pin TO-252
SPX1129R-3.3/TR	1%	-40°C to 125°C	3.3V	3-Pin TO-252
SPX1129R-5.0	1%	-40°C to 125°C	5.0V	3-Pin TO-252
SPX1129R-5.0/TR	1%	-40°C to 125°C	5.0V	3-Pin TO-252
SPX1129T3-3.3	1%	-40°C to 125°C	3.3V	3-Pin TO-263
SPX1129T3-3.3/TR	1%	-40°C to 125°C	3.3V	3-Pin TO-263
SPX1129T3-5.0	1%	-40°C to 125°C	5.0V	3-Pin TO-263
SPX1129T3-5.0/TR	1%	-40°C to 125°C	5.0V	3-Pin TO-263
SPX1129U-3.3	1%	-40°C to 125°C	3.3V	3-Pin TO-220
SPX1129U-5.0	1%	-40°C to 125°C	5.0V	3-Pin TO-220

Available in lead free packaging. To order add "-L" suffix to part number.

Example: SPX1129T3-5.0/TR = standard; SPX1129T3-L-5.0/TR = lead free

/TR = Tape and Reel

Pack quantity is 500 for TO-263, 2,000 for TO-252 and 2,500 for SOT-223.

Sipex Corporation

ANALOG EXCELLENCE

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